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APPLICATION FOR PATENT

FOR INVENTION OF

**TOYS, SOFTWARE AND METHODS FOR PRESENTING PLAY SURFACES  
WITH DYNAMICALLY ADJUSTABLE IMAGES**

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# TOYS, SOFTWARE AND METHODS FOR PRESENTING PLAY SURFACES WITH DYNAMICALLY ADJUSTABLE IMAGES

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## BACKGROUND

1. Field of the invention.

The present invention is related to the field of toys, and more specifically to toys, software and methods for presenting play surfaces with dynamically adjustable images.

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2. Description of the related art.

A common type of toy for children is playhouses, which include dollhouses, play theaters, barnyards, etc. A problem with this type of toy is that a single playhouse can be used as only one type of structure. Accordingly, a parent needs to buy a playhouse for each type of play, which is expensive.

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## BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a diagram of a toy set made according to an embodiment of the invention.

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Fig. 2 is a rear view of a side panel of the toy set of Fig. 1.

Fig. 3 is a diagram of a toy set made according to another embodiment of the invention.

Fig. 4 is a rear view of the side panel of the toy set of Fig. 3.

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Fig. 5 is a diagram of a toy set made according to yet another embodiment of invention.

Fig. 6 is a diagram of a toy set made according to one more embodiment of the invention.

Fig. 7 is a diagram of a toy set made according to an additional embodiment of the invention.

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Fig. 8 is a diagram of the toy set made according to a further embodiment of invention.

Fig. 9 is a flowchart illustrating a method according to an embodiment of the invention.

## DETAILED DESCRIPTION

The present invention provides toys, toy sets software and methods for presenting surfaces with dynamically adjustable images. Briefly, different images may be used to make a single surface appear to be different things at different times to a child. A single toy may thus be used as many different playhouses, and with many different types of toy figurines. As such, the present invention is an imagination enabler, not an imagination substitute.

Toy sets made according to the invention are now described in more detail, also referring to embodiments of Figs. 1-8. Various features are shown in each of the embodiments. These features are by way of example, and not of limitation. Indeed, it is possible to form embodiments of the invention by selectively combining different features of the various drawings in this document.

One set of embodiments provides a toy set that includes at least one substantially flat side panel that has a first surface. Referring to Fig. 1, toy set 100 includes a side panel 110 that has a first surface 114. Referring to Fig. 3, toy set 300 includes a side panel 310 that has a first surface 314. Referring to Fig. 5, toy set 500 includes a side panel 510 that has a first surface 514. Referring to Fig. 6, toy set 600 includes a side panel 610 that has a first surface 614. Referring to Fig. 7, toy set 700 includes a side panel 710 that has a first surface 714. Referring to Fig. 8, toy set 800 includes a side panel 810 that has a first surface 314.

The toy set of the invention may optionally be used with toy figurines, although the invention is not limited in that regard. For example, toy set 100 is to be used with figurine 118. Additionally, toy set 700 may be used with toy figurine 718, and toy set 800 may be used with toy figurine 818. In all these examples, the toy figurines are shown on round bases, although the invention is not limited in that regard. Alternately, the toy figurines may be provided with their respective sets. An advantage of the present invention is that many, diverse toy figurines may be provided with a single set.

In these embodiments, the side panel e.g., side panels 110, 310, 510, 610, 710, and 810, is adapted to be placed on a vertical surface, such that the first surface is substantially upright. The side panels 110, 310, 510, 610, 710, and 810 alternatively may be adapted to be placed on a horizontal surface such as when simulating a floor.

Adapting may be in any way known in the art, and a person skilled in the art will deduce numerous such ways upon reading the present description. A few such ways are shown in some of the drawings. More specifically, side panel 110 has protrusions 120 for supporting it in an upright position. Side panel 310 has bent members 320 for hooking into mating openings (not shown) of other structures (not shown). In this case, the other structure could be a support, or even a flat panel that could simulate a floor. Side panel 510 has bent members 520 for interlocking with other structures (not shown). In this case, the other structure could be a support or even a flat panel that could simulate an adjacent sidewall.

In most of these embodiments, the first surface is optionally adapted to simulate a wall of the structure, although the invention is not limited in this regard. This works well when the first surface is used in an upright orientation. As an example of adapting, first surface 114 may simulate wallpaper 124, either by attaching actual toy wallpaper, or by being appropriately painted, etc. First surface 314 may be raised to simulate a brick wall 324. Alternatively, however, the first surface is optionally adapted to simulate a floor or other surfaces in a given structure.

Importantly, the toy set 100, 300, 500, 600, 700 and 800 made according to the invention includes at least one display, e.g., displays 130, 330, 530, 632, 634, 730, and 830, respectively. The displays 130, 330, 530, 632, 634, 730, and 830 may be made by any means known in the art, or combinations of such means. For example, the displays 130, 330, 530, 632, 634, 730, and 830 may include light emitting diodes (LEDs). In another embodiment, the displays 130, 330, 530, 632, 634, 730, and 830 may include a screen. The screen may be a color screen, a liquid crystal display (LCD) screen, a touch screen, or any other type of screen known in the art. Alternately, the displays 130, 330, 530, 632, 634, 730, and 830 may be made by printed electronic ink, which is sometimes also known as e-ink. Printed electronic ink is any medium that includes individual pixels that may be activated by electricity. The electronic ink may be printed directly on the sidewall, or a special panel of the displays 130, 330, 530, 632, 634, 730, and 830. The displays 130, 330, 530, 632, 634, 730, and 830 alternatively may take the form of whatever surface to which they are attached. The displays 130, 330, 530, 632, 634, 730,

and 830 alternatively may alternatively be any kind of projection device including projection televisions and the like.

In one set of embodiments, the displays 130, 330, 530, 632, 634, 730, and 830 are attached to the first surface 114, 314, 514, 614, 714, and 814, respectively. The displays  
5 130, 330, 530, 632, 634, 730, and 830 may have an area that is smaller or larger than the area of the corresponding first surface 114, 314, 514, 614, 714, and 814. In some instances, the displays 130, 330, 530, 632, 634, 730, and 830 have an area less than one quarter of the area of the corresponding first surface 114, 314, 514, 614, 714, and 814. In other instances, the displays 130, 330, 530, 632, 634, 730, and 830 have an area  
10 substantially coextensive with that of the first surfaces 114, 314, 514, 614, 714, and 814, respectively.

Attachment of the displays 130, 330, 530, 632, 634, 730, and 830 to the corresponding first surfaces 114, 314, 514, 614, 714, and 814 may be by any means known in the art. By way of example, toy set 100 includes display 130, which is attached  
15 to first surface 114 of side panel 110 by means of a Velcro® type strip 135. By way of another example, toy set 300 includes a display 330. Display 330 and side panel 310 have at least one protrusion 333 and a mating opening 336. In embodiment of Fig. 3, it is the display 330 that has protrusions 333, and it is the side panel 310 that has mating openings 336. Display 330 is attached to first surface 314 by inserting protrusions 333  
20 into mating openings 336 in the direction of arrow 339. Equivalently, the display 330 may have the mating openings 336, and the side panel 310 may have the protrusions 333.

In another set of embodiments shown in Fig. 5, display 530 is made from electronic ink printed directly on the first surface 514. In yet another embodiment shown in Fig. 6, displays 632 and 634 are embedded in side panel 610, such that only a top  
25 surface is visible, and optionally part of first surface 614. Displays 730 and 830 are similarly embedded in side panels 710, 810. A person skilled in the art should understand the word attached as used herein to mean any means by which a display is coupled to its corresponding side panel, that is, where a display is attached, embedded, integrally formed on side panel, and the like.

30 The displays 130, 330, 530, 632, 634, 730, and 830 are adapted to display various images. The images may include a fireplace image, a window view image, etc. For

example, display 632 may display an image of a window view 642, while display 634 may display an image of a fireplace 644.

In instances where the displays 130, 330, 530, 632, 634, 730, and 830 cover the entire corresponding first surfaces 114, 314, 514, 614, 714, and 814, the image may also be that of an outdoor image. For example, display 730 may display an image of a soccer field 740 giving the illusion of depth.

In other instances where the displays 130, 330, 530, 632, 634, 730, and 830 cover at least much of the first surfaces 114, 314, 514, 614, 714, and 814, respectively, the image may be that of an entire wall. The wall image may be one of a castle wall, a hospital wall, a school wall, a home wall, a shop wall, or an outdoor image. Alternately, the image may give the illusion of depth. For example, display 830 may project an image of the theater stage 840.

The displays 130, 330, 530, 632, 634, 730, and 830 display the image responsive to a received set of image data. Accordingly, the image may be static or dynamic, in other words changing with time, depending on the data. In some embodiments, the image data is stored in a memory. Many sets of image data may be stored in the memory. In these cases, if any toy figurines are provided, they have a theme related to the theme of the image. For example, the image of soccer field 740 matches the theme of toy figurine 718, which is a soccer player. In addition, the image of the theater stage 840 matches the theme of toy figurine 818, which is a dancer.

In some embodiments, the displays 130, 330, 530, 632, 634, 730, and 830 receive image data that is dynamically changing. For example, the image data may be derived from a television signal, a streaming video signal, a video camera, a global computer network, etc.

In some embodiments, multiple displays are provided. In addition, the displays 130, 330, 530, 632, 634, 730, and 830 may receive coordinated images. For example, the window view image 642 may be coordinated with the fireplace view image 644 shown in Fig. 6. When the window view image 642 becomes dark, the fireplace view image 644 may show a lit fire.

In some embodiments, the image data is generated internally. For example, toy set 600 includes a light sensor 660. Light sensor 660 may be placed on the back surface

of side panel 610, although the invention is not limited in that regard. Light sensor 660 senses the amount of illumination, and accordingly controls displays 632 and 634.

In other embodiments, the image data is delivered to the display. This can be performed by any way known in the art. For example, image data may be delivered by way of  
5 coupling to a global computer network such as the Internet®. Many such ways will become apparent to the person skilled in the art in view of the present description, and also in view of the nature and the requirements of the display and its image data.

In some embodiments, the side panels 110, 310, 410, 510, 610, 710, and 810 may include a data connection e.g., opening 150 of Fig. 1, for receiving image data. The  
10 displays 130, 330, 530, 632, 634, 730, and 830 may be coupled to a corresponding data connection. For example, side panel 110 has the data connection 150. In addition, mating openings 336 in side panel 310 may be considered data connections. In that case, it is advantageous that at least some of the protrusions 333 are metallic, so that they may carry the data to the display 330.

In other embodiments, the image data is delivered to the display e.g., display 130,  
15 by a cable e.g., cable 154 shown in Fig. 1. Cable 154 optionally goes to data connection 150, although that is not necessary. As another example, image data is delivered to display 330 via a cable 354, directly from a personal computer 376 as shown in Fig. 3. Cable 354 may terminate in a connector 356. Connector 356 may be a serial port,  
20 although the invention is not limited in that regard. Connector 356 may plug into a suitable mating port 358, which may be located in the side panel 310. Similarly, image data is delivered to display 710 via a cable 754 as shown in Fig. 7 or to display 810 via a cable 854 as shown in Fig. 8.

In yet other embodiments, the image data is delivered to the display wirelessly.  
25 This may be performed in any way known in the art. For example, toy set 500 includes a transmitting antenna 562 and receiving antenna 564 as shown in Fig. 5. The receiving antenna 564 may be inside the side panel 510, although the invention is not limited in that regard. The receiving antenna 564 is adapted to be coupled to an input of the display 530. The transmitting antenna 562, and the receiving antenna 564 may be transmitting  
30 radio frequency (RF) waves 566. Alternately and equivalently, they could be transmitting infrared (IR) light.

Optionally the invention also includes a stand-alone controller e.g., controller 670 transmits the image data to the display 632, 634. By stand-alone it is meant that the controller is distinct from a personal computer. It may be advantageous to provide the controller e.g., controller 670, for driving the display e.g., display 632, 634 and other devices, such as the lamp 780 (Fig. 7) (the lamp 780 may alternatively be any type of light source), the speaker 880 (Fig. 8), the antenna 562 (Fig. 5), etc. This may eliminate any unusual power requirements from an associated personal computer.

The stand-alone controller e.g., controller 670, may optionally be adapted to operate by itself. For example, controller 670 is entirely within the side panel 610, although the invention is not limited in that regard. In addition, toy set 800 includes a controller 870 that may have controls that select a desired image.

The stand-alone controller e.g., controller 570, may optionally receive inputs from a personal computer e.g., personal computer 576, although the invention is not limited in that regard. For example, toy set 100 includes a controller 170 that receives inputs from a personal computer 176. Toy set 500 includes a controller 570 that receives inputs from a personal computer 576, and communicates with a suitable unit 572 of sidewall 510. Unit 572 can be placed entirely within sidewall 510, although the invention is not limited in that regard. Toy set 700 includes a controller 770 that receives inputs from a personal computer 776, and communicates with a suitable unit 772 of sidewall 10. In these cases, the stand-alone controller may be operated by commands from the associated personal computer. The images, therefore, are controlled by the personal computer. Using the personal computer in connection with the controller permits greater versatility in the images. In addition, later generated images may be downloaded for play.

Optionally a toy set according to the invention may include a lighting source e.g., lamp 780, although the invention is not limited in that regard. The lamp 780 may be provided in an appropriate stand, commensurate with the dimensions of the toy figurine 718. The lamp 780 may be turned on and off, in agreement with a theme of the display. For example, a toy lamp 780 may receive inputs from a light sensor 660 (shown in Fig. 6), to come on when certain environmental conditions are met, for example, when it is dark. In Fig. 7, the lamp 780 receives input from controller 770.



Optionally a toy set according to the invention may also include an audio device e.g., speaker 880 shown in Fig. 8, although the invention is not limited in that regard. The speaker 880 may be sized and shaped commensurately with a size of figurine 818. The speaker may receive inputs from a personal computer or stand-alone controller to  
5 play sounds in accordance with a theme of the display, although the invention is not limited in that regard. In Fig. 8, the speaker 880 receives inputs from controller 870.

In addition, a toy set according to the invention may optionally include a detector e.g., light sensor 660. The detector may be used to sense certain environmental conditions, for example, light sensor 660 may be used to detect whether it is dark or cold.  
10 The image data may be responsive to the detector, for example, if the light sensor 660 senses that it is cold outside then the image data may be that of a fire in a fireplace as shown in Fig. 6.

Alternately, the detector e.g., antenna 792, may be used to detect a characteristic e.g., location or identification, of a toy figurine e.g., toy figurine 718. If the detector  
15 detects a location it may be with respect to the side panel e.g., side panel 710, and ultimately with respect to the display e.g., display 730. The display may then react to the characteristic detected e.g., presence or identification of the toy figurine, by showing an appropriate image. For example, toy set 700 includes an antenna 792 and an RF transponder 794. Antenna 792 transmits a detection signal, and then detects a return  
20 signal (not shown) from the RF transponder 794. The controller 770 or computer 776 may process the return signal (not shown) from the RF transponder 794 to determine the where the toy figurine 718 is located. Alternatively, the controller 770 or computer 776 may process the return signal (not shown) from the RF transponder 794 to determine what kind of toy is toy figurine 718. That is, the RF transponder 794 may transmit a  
25 return signal (not shown) unique to toy figurine 718 or it may transmit a return signal (not shown) unique to a group of toy figurines of which toy figurine 718 is a member. In another example, toy set 800 includes a pressure sensor 892 as part of a floor panel 894. Pressure sensor 892 senses the weight of toy figurine 818 that is indicative of not only presence of the toy figuring 818 but of the type of toy figurine 818 (a ballerina in Fig. 8),  
30 and in turn may cause display 830 to display the image of the theater stage 840.

It is readily apparent that one or more devices that include logic circuitry may implement the present invention. A device that includes a dedicated processor system that may include a microcontroller or a microprocessor may also implement the invention.

5       The invention additionally provides methods. Some of these methods have been described above, and relate mostly to play methods. Others are described below. Moreover, the invention provides apparatus that performs, or assists in performing the methods of the invention. This apparatus may be specially constructed for the required purposes, or it may comprise a general-purpose computer selectively activated or  
10       reconfigured by a computer program stored in the computer. The methods and algorithms presented herein are not necessarily inherently related to any particular computer or other apparatus. In particular, various general-purpose machines may be used with programs in accordance with the teachings herein, or it may prove more convenient to construct more specialized apparatus to perform the required method steps.  
15       The required structure for a variety of these machines will appear from this description.

Useful machines or articles for performing the operations of the present invention include general-purpose digital computers or other similar devices. In all cases, there should be borne in mind the distinction between the method of operating a computer and the method of computation itself. The present invention relates also to method steps for  
20       operating a computer and for processing electrical or other physical signals to generate other desired physical signals.

The invention additionally provides a program, and a method of operation of the program. The program is most advantageously implemented as a program for a computing machine, such as a general-purpose computer, a special-purpose computer, a  
25       microprocessor, etc.

The invention also provides a storage medium that has the program of the invention stored thereon. The storage medium is a computer-readable medium, such as a memory, and is read by the computing machine mentioned above. For example, personal computer 176 includes a memory 190, stand-alone controller 570 includes a memory 590,  
30       and stand-alone controller 870 includes a memory 890. In addition, a controller such as controller 670 may be implemented with a memory, or may not.

A program is generally defined as a sequence of steps leading to a desired result.

These steps, also known as instructions, are those requiring physical manipulations of physical quantities. Usually, though not necessarily, these quantities take the form of electrical or magnetic signals capable of being stored, transferred, combined, compared,

5 and otherwise manipulated or processed. When stored, they may be stored in any computer-readable medium. It is convenient at times, principally for reasons of common usage, to refer to these signals as bits, data bits, samples, values, elements, symbols, characters, images, terms, numbers, or the like. It should be borne in mind, however, that all of these and similar terms are associated with the appropriate physical quantities, and  
10 that these terms are merely convenient labels applied to these physical quantities.

This detailed description is presented largely in terms of flowcharts, display images, algorithms, and symbolic representations of operations of data bits within a computer readable medium, such as a memory. Such descriptions and representations are the type of convenient labels used by those skilled in programming and/or the data  
15 processing arts to effectively convey the substance of their work to others skilled in the art. A person skilled in the art of programming may use this description to readily generate specific instructions for implementing a program according to the present invention. For the sake of economy, however, flowcharts used to describe methods of the invention are not repeated in this document for describing software according to the  
20 invention.

Often, for the sake of convenience only, it is preferred to implement and describe a program as various interconnected distinct software modules or features, collectively also known as software. This is not necessary, however, and there may be cases where modules are equivalently aggregated into a single program with unclear boundaries. In  
25 any event, the software modules or features of the present invention may be implemented by themselves, or in combination with others. Even though it is said that the program may be stored in a computer-readable medium, it should be clear to a person skilled in the art that it need not be a single memory, or even a single machine. Various portions, modules or features of it may reside in separate memories, or even separate machines.  
30 The separate machines may be connected directly, or through a network, such as a local access network (LAN), or a global network, such as the Internet.

In the present case, methods of the invention are implemented by machine operations. In other words, embodiments of the program of the invention are made such that they perform methods of the invention that are described in this document. These may be optionally performed in conjunction with one or more human operators  
5 performing some, but not all of them. As described above, the users need not be collocated with each other, but each only with a machine that houses a portion of the program. Alternately, some of these machines may operate automatically, without users and/or independently from each other.

Referring now to figure 9, a flowchart 900 is used to illustrate a method according  
10 to embodiments of the invention. The method is for controlling an image of the display depending on a position of a toy figurine with respect to the display.

According to an optional box 910, a detection signal is transmitted to a RF transponder of a toy figurine. The detection signal is transmitted by an activated antenna.

According to a next box 920, it is inquired whether a return signal has been  
15 detected by a detector. According to one embodiment, the return signal is generated from the RF transponder of a toy figurine, and the detector is the antenna itself. In another embodiment, the detector is a pressure sensor. If the return signal has not been detected, execution returns to box 910, effectively waiting for a returned signal to be detected.

If yes, then according to an optional box 930, a set of image data is chosen,  
20 depending on the output of the detector. It may be chosen among a number of sets of image data. In another embodiment, there is only one set of image data, and that is the set that is chosen.

According to a next box 940, the chosen image data is transmitted to the display,  
25 to display the image. In one embodiment, transmitting is performed wirelessly, such as by RF signals or by infrared signals.

A person skilled in the art will be able to practice the present invention in view of the description present in this document, which is to be taken as a whole. Numerous details have been set forth in order to provide a more thorough understanding of the invention. In other instances, well-known features have not been described in detail in  
30 order not to obscure unnecessarily the invention.

While the invention has been disclosed in its preferred form, the specific embodiments thereof as disclosed and illustrated herein are not to be considered in a limiting sense. Indeed, it should be readily apparent to those skilled in the art in view of the present description that the invention may be modified in numerous ways. The  
5 inventor regards the subject matter of the invention to include all combinations and sub-combinations of the various elements, features, functions and/or properties disclosed herein.

The following claims define certain combinations and sub-combinations, which are regarded as novel and non-obvious. Additional claims for other combinations and  
10 sub-combinations of features, functions, elements and/or properties may be presented in this or a related document.